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(54) Title: A METHOD FOR HAIR COLOR TREATMENT

(57) Abstract: An aiding system for hair color that includes input data indicative of desired customer color hair data and existing customer color hair data. The latter data indicates also the present hair color and hair characteristics data. The system further stores data that includes static aiding data and pertinent hair treatment procedures. Still further, the system includes a processor that is capable of processing the customer color hair data, desired customer color hair data and static aiding data for executing hair color treatment procedure.

A METHOD FOR HAIR COLOR TREATMENT

FIELD OF THE INVENTION

The present invention is in the general field of hair color treatment.

BACKGROUND OF THE INVENTION

Coloring one's hair has always been very popular, and customers usually turn to professional salons to have their hair dyed. Typically, a customer identifies his/her desired hair color from a catalog, and the hairdresser, who specializes in this field, selects the color ingredients and pertinent treatments that need to be applied to the customer in order to arrive at the desired result. In many cases, this task is accomplished by way of a manual procedure which is strongly dependent on the personal skills of the professional. Considering that such skills are normally varied from one individual to the other, there are many cases in which the desired result is not accomplished, or in other words, the customer does not receive the precise color he/she desires. Inadequate hair color treatment may stem from various reasons including:

- The failure to correctly identify the customer's hair present color;
- The failure to identify the various hair characteristics which affect the end result; in other words, applying the same ingredients to two customers having the same hair color but different hair characteristics may be bring about a different color result;
- The failure to take into account previous hair color treatments undergone by the consumer, which also has an effect on the end result.

There have been attempts to utilize a computerized systems which purported to address at least partially the specified factors. These systems have failed to duly address these factors and therefore have not matured to a commercially available systems.

There are various publications including WO 96/41139 which concern a computerized system for supporting hair coloring, but these publication do not focus on the correct factors or fail to suggest adequate solution and therefore fall short in accomplishing the desired result.

There are a number of systems for hair coloring calculations around the world:

A. Internet Applications - a number of web sites assist in color selection: an example can be seen in Clairol's web site:

- http://www.clairol.com/tryit/mov7.htm
- http://www.clairol.com/haircolor/customcolor.html.

B. Acquisition systems - CD's distributed to beauty parlors or privately. Examples:

- Carin has a system distributed on a CDI for hair coloring calculations.
- Cosmopolitan sells a "Visual Makeover" CD for self planning of Makeup, including hair-styling.
- Color Calculator of Wella - The calculator is in the size of an electronic diary but has several limitations including:
  - The information on the coloring should be installed in any specific coloring process.
  - The Calculator has a limited memory and thereby its operation is limited.

There is accordingly a need in the art to provide for a hair coloring system to assist the professional in obtaining an accurate hair color that would meet the customer's request.

SUMMARY OF THE INVENTION

In accordance with one aspect of the invention, the hair characteristics of the customer are identified and are utilized in the process of determining the color ingredients and the pertinent treatments so as to achieve the desired hair color end result.

In accordance with another aspect of the invention, the customer's present hair color data, as well as his/her previous hair color treatments, are kept in a database, and are retrieved for any future treatment. By following this approach, the prospects of failing to correctly identify the customer's present hair color, as well as omitting to take into account the relevant factors of the customer's prior hair color treatments, are substantially reduced, and accordingly, this improves the prospects of obtaining the desired end result.

By a preferred embodiment, the database further stores the relevant hair characteristics data to further improve the so-obtained hair color end result.

By a specific embodiment the hair characteristic's data include:

- scalp sensitivity data;
- whether or not the hair has been highlighted;
- whether or not the hair has undergone a permanent or anti-permanent treatment;
- whether or not there is substantial percentage of white hair;
- whether or not there is damaged hair or split hair ends;

The invention provides for an aiding system for hair color comprising:

(a) input means for receiving *desired customer color hair data;* and *customer color hair data* that include *present hair color* and *hair characteristics data;*

(b) storage means for storing data that includes *static aiding data* and *pertinent hair treatment procedures*

(c) processor responsive to at least said *customer color hair data, desired customer color hair data and static aiding data* for executing hair color treatment procedure.

The present invention further provides for an aiding system for hair color comprising:

(a) input means for receiving *desired customer color hair data;* and *customer color hair data* that include *present hair color* and *hair characteristics data;*

(b) storage means for storing data that includes *static aiding data* and *pertinent hair treatment procedures*

(c) processor responsive to at least said *customer color hair data, desired customer color hair data and static aiding data* for executing hair color treatment procedure; the hair color procedure includes a pigment bleaching calculation that takes into account at least the following parameters:

i) different in hair color levels between present hair color and desired hair color; and

ii) different in hair color pigment between present hair color and desired hair color.

Still further, the invention provides for an aiding system for hair color comprising:

(a) input means for receiving *desired customer color hair data;* and *customer color hair data* that include *present hair color* and *hair characteristics data;*

(b) storage means for storing data that includes *static aiding data* and *pertinent hair treatment procedures*

(c) processor responsive to at least said *customer color hair data, desired customer color hair data and static aiding data* for executing hair color treatment procedure; wherein in the cases that the hair characteristic data specify that the present hair color includes substantial amount of white hair, the hair color treatment procedure includes an indication that a white hair additive should be applied to the roots in the case of dyed hair or to a natural hair for a predetermined period before coloring.

The invention further provides for an aiding system for hair color comprising:

(a) input means for receiving *desired customer color hair data;* and *customer color hair data* that include *present hair color* and *hair characteristics data;*

(b) storage means for storing data that includes *static aiding data* and *pertinent hair treatment procedures;*

(c) processor responsive to at least said *customer color hair data, desired customer color hair data and static aiding data* for executing hair color treatment procedure; the hair color treatment procedure includes providing an indication in the case that a sensitive scalp parameter is set or a damaged hair parameter is set as well as the pigment removal calculation indicates that an oxygen percentage of 9% or more is to be used in the color treatment procedure.

Still further, the invention provides for an aiding system for hair color comprising:

(a) input means for receiving *desired customer color hair data;* and *customer color hair data* that include *present hair color* and *hair characteristics data;*

(b) storage means for storing data that includes *static aiding data* and *pertinent hair treatment procedures;*

processor responsive to at least said *customer color hair data, desired customer color hair data and static aiding data* for executing hair color treatment procedure; the hair color treatment procedure includes an indication in the case that a pigment removal calculation give rise to affirmative result and the permanent or anti-permanent parameter are set.

The invention further provides for a method for aiding in hair color comprising:

(a) receiving *desired customer color hair data;* and *customer color hair data* that include *present hair color* and *hair characteristics data;*

(b) storing data that includes *static aiding data* and *pertinent hair treatment procedures*

(c) executing hair color treatment procedure utilizing at least said *customer color hair data, desired customer color hair data and static aiding data.*

Still further, the invention provides for a method for aiding in hair color comprising:

(a) receiving *desired customer color hair data;* and *customer color hair data* that include *present hair color* and *hair characteristics data;*

(b) storing data that includes *static aiding data* and *pertinent hair treatment procedures*

(c) executing hair color treatment procedure utilizing at least said *customer color hair data, desired customer color hair data and static aiding data.*

the hair color procedure includes a pigment bleaching calculation step that takes into account at least the following parameters:

i) different in hair color levels between present hair color and desired hair color; and

ii) different in hair color pigment between present hair color and desired hair color.

The invention further provides for a method for aiding in hair color comprising:

(a) receiving *desired customer color hair data;* and *customer color hair data* that include *present hair color* and *hair characteristics data;*

(b) storing data that includes *static aiding data* and *pertinent hair treatment procedures*

(c) executing hair color treatment procedure utilizing at least said *customer color hair data, desired customer color hair data and static aiding data.*

the hair color treatment procedure includes the step of: in the cases that the hair characteristic data specify that the present hair color includes substantial amount of white hair, the hair color treatment procedure generating an indication that a white hair additive should be applied to the roots in the case of dyed hair or to a natural hair for a predetermined period before coloring.

Still further the invention provides for a method for aiding in hair color comprising:

(a) receiving *desired customer color hair data;* and *customer color hair data* that include *present hair color* and *hair characteristics data;*

(b) storing data that includes *static aiding data* and *pertinent hair treatment procedures*

(c) executing hair color treatment procedure utilizing at least said *customer color hair data, desired customer color hair data and static aiding data.*

the hair color treatment procedure includes the step of providing an indication in the case that a sensitive scalp parameter is set or a damaged hair parameter is set as well as the pigment removal calculation indicates that an oxygen percentage of 9% or more is to be used in the color treatment procedure.

Still further, the invention provides for a method for aiding in hair color comprising:

(a) receiving *desired customer color hair data;* and *customer color hair data* that include *present hair color* and *hair characteristics data;*

(b) storing data that includes *static aiding data* and *pertinent hair treatment procedures*

(c) executing hair color treatment procedure utilizing at least said *customer color hair data, desired customer color hair data and static aiding data.*

the hair color treatment procedure includes the step of generating an indication in the case that a pigment removal calculation give rise to affirmative result and the permanent or anti-permanent parameter are set.

It will also be understood that the system according to the invention may be a suitably programmed computer. Likewise, the invention contemplates a computer program being readable by a computer for executing the method of the invention. The invention further contemplates a machine-readable memory tangibly embodying a program of instructions executable by the machine for executing the method of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

In order to understand the invention and to see how it may be carried out in practice, a preferred embodiment will now be described, by way of non-limiting example only, with reference to the accompanying drawings, in which:

Fig. 1 is a generalized architecture of a system of the invention;

Fig. 2 is a general block diagram of the partial contents of the memory in the system architecture of Fig. 1;

Fig. 3 is flow chart of the operational steps of a natural hair treatment procedure in accordance with one embodiment of the invention; and

Fig. 4 is a flow chart of the operational steps of a dyed hair treatment procedure in accordance with one embodiment of the invention.

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

There is now provided a detailed description of specific embodiments in which the present hair color data includes one of the following:

I . A customer's natural hair color, or

II. A customer's existing dyed hair color

and, in the case that the customer has white hair,

III. An indication of the percentage thereof.

The invention is not bound by this particular example and accordingly the various elements of present hair color data may be modified, all as required and appropriate.

Furthermore, in the present embodiment, the hair characteristic's data include:

- scalp sensitivity data;
- whether or not the hair has been highlighted;
- whether or not the hair has undergone a permanent or anti-permanent treatment;
- whether or not there is substantial amount (and in preferred embodiment 80% or more) white hair;
- whether or not there is damaged hair or split hair ends;

The invention is not bound by this particular example and accordingly by other embodiments any subset of the specified hair characteristic members may be utilized. By a modified embodiment one or more of the specified members in the set or the subset may be modified, all as required and appropriate.

By this embodiment, *hair color* consists of *color level* and *color pigment*. The invention is not bound to this specific hair color representation and other representations are applicable.

For convenience of explanation, all the examples refer to a color table that complies with the hair color catalogue of the *Koleston Perfect* of the *Wella* ™ Company, as appearing in Appendix 1. *Hair color* is designated as *xx*| *yy*, where *xx* stands for the color level and *yy* for the color pigment.

Those versed in the art can readily appreciate that the invention is by no means bound by this particular example. Thus, for example, color tables of other companies may be used, *mutatis mutandis*.

Bearing this in mind, attention is first drawn to Fig. 1, illustrating a generalized architecture of a system of the invention. The system **1** includes a processor **2**, couples to a storage means **3**, input means **4** and output means **5**. The storage means may be any of the known internal or external devices for storing data, and may be located at the same physical location of processor **2**, or, if desired, may be at a remote location, in which case it is coupled to the processor by means of a communication network (not shown) in Fig. 1. The Input means **4** may be any of the known per se devices, such as a keyboard, receiving communication board, or any other input device for inputting data to the system. The output means may be any known per se output devices such as, for example, a display screen.

Those versed in the art can readily appreciate that the generalized system architecture depicted in Fig. 1 is by no means binding and accordingly the architecture of the system of the invention may vary depending upon the specific application.

Turning now to Fig. 2, there is shown is a general block diagram of the partial contents of the memory in the system architecture of Fig. 1; The storage means includes static aiding data, such as the pigment table, white hair table, tone enriching and additive table, as well as database portion for holding customers' hair characteristic data and customers' present hair color data. The storage means further includes a set of hair treatment procedures, including a natural hair color treatment procedure, an existing dyed hair color procedure, and various alterations that should be applied, depending *inter alia* on the customer's hair characteristic data. The contents of the storage medium in accordance with the invention is by no means bound by this example.

The operation of the system of the invention will now be described with reference to Figs. 3 and 4.

Turning at first to Fig. 3, there is shown a flow chart of the operational steps of a natural hair treatment procedure in accordance with one embodiment of the invention. As shown, a first pigment removing (referred to also as pigment bleaching) step is applied, which, *inter alia*, determines whether or not a pigment

should be removed (**31**), followed by a white hair treatment step, which determines if and to what extent a color base should be added, depending upon the percentage of existing white hair (**32**). In the case that pigments have been bleached in step (**31**), there follows a post-pigment removal treatment stage (**33**). If, on the other hand, the pigment bleaching step was not applied (**34**), one out of two possible direct hair dying treatments is applied, depending on whether the target hair color is darker than the existing one. Each of the specified steps will now be described in more detail. For a better understanding of the pigment removal step, attention is drawn to Appendix 2, showing a pigment table.

Before proceeding any further, it should be noted that the tables appearing in the Appendix include data that has been determined on an empirical basis, and are applicable to hair color that complies with the catalog *Koleston Perfect* of the *Wella*™ Company. Those versed in the art will readily appreciate that not only is the invention not bound by the hair colors as stipulated by the *Wella*™ Co., it is also not bound by the specific data in the annexed tables. These data are provided for clarity of explanation and in order to assist the artisan to carry out a preferred embodiment of the invention and, accordingly, the structure and contents of the tables may vary in other embodiments of the invention, all as required an appropriate, depending upon the particular application.

The pigment table in Appendix 2 includes the following columns:

- Natural Hair Color (**201**)
- Existing Dyed Hair Color (**202**)
- "Warm to Warm" (**203**) (representative of a transition from warm color to warm color)
- "Warm to Cold" (**204**) (representative of a transition from warm color to cold color)
- "Cold to Cold" (**205**) (representative of a transition from cold color to cold color)

"Cold to Warm" (**206**) (representative of a transition from cold color to warm color)

The difference in color level is designates **(207)** and the same is designated by **(208)**, **(209)** and **(210)**. Reference numerals **(211)** to **(214)** all designate differences in color pigment. Reference numerals **(215)** and **(216)** stand for the 1st pigment removal step and the 2nd pigment removal step, respectively, each of which includes the following three sub-columns, namely: powder weight **(217,218)**, percentage of oxygen **(219, 220)** and oxygen quantity **(221, 222)**.

The decision whether or not to apply the pigment removal step in accordance with the pigment table will now be described. Consider, for example, a customer having a natural hair color, who wishes to dye his/her hair to a target hair color having a color level which is six levels higher than the current natural hair color level. This situation corresponds to entry **(230)** in the table, indicating a color level difference of 5-6. As readily arises from the pigment table, this entry corresponds to a first pigment removal step **(215)**, in which 50 grams of powder **(217)**, and 9% of oxygen **(219)** and 100 grams of oxygen **(221)** should be applied to the treated customer for accomplishing pigment removal. As further arises from Table II, in the case that the color level difference drops below five, the entries of the difference level column are empty, (see e.g. **223**), indicating that no pigment removal step is required.

There is a special treatment that is proposed in the case that the difference in hair level is 4 **(231)** which aims at moderating the pigment removal stage in the sense that less radical substances would be used. Thus, instead of powder that is used (in the case of 5-8 hair level difference) a super-level blond **(232)** is used *11/08* (that corresponds to super blonde level *12/03* of the Koleston Perfect catalog in Table 1) in 40 grams **(233)** and color additive as stipulated in table 6. In a second cleaning stage a tone enriching ingredient as stipulated in Table 6 **(235)** with 12% oxygen **(236)** at quantity that is identical to the quantity of the color additive **(235)** + 80 (all in grams).

Table 6 illustrates the Tone enriching pigment that is used (78, 55 or 33 depending upon the desired pigment level in the warm colors). The entries with "—

" signify that no additive is required. In some cases (for , say desired color pigment 53) two tone enriching pigments are used (8 grams of 55 and 8 grams of 33).

Reverting now to Table 2, The situation becomes a little more complicated in the case of existing dyed hair. Consider, for example, a transition from a "warm" existing dyed hair color, to a "cold" target hair color (Column **204**), in which the color level difference is 5. The relevant entry here is **(224)**, which stipulates that a first pigment removal step should be applied with 50 grams powder, 9% oxygen and 100 grams oxygen. However, if the pigment difference (Column **212**) stipulates that the existing color pigment is, say, 4, and the desired color pigment is, say, 01 (entry **225**), the relevant pigment treatment stipulates that the same powder rate and oxygen quantity should be used, however, this time, with 6% oxygen. The rule that is applied in case of contradicting instructions, (in this case, 9% or 6% oxygen), stipulates that the more radical treatment should be applied, and by this example, the 9% oxygen. As is shown in the table, there are situations where two pigment removal steps are applied successively, e.g. for a color level difference of 8, in the case of natural hair color. Those versed in the art will readily appreciate that by this embodiment not only difference in color levels is considered but also (whenever applicable) the difference between pigment values is taken in account in order to decide whether or not to apply pigment bleaching.

It should be noted that in accordance with the invention the pigment removal calculation takes into account at least the parameters of difference in color level between present and desired hair color and difference in color pigment between present and desired hair color. The example of table 2 is only one out of many possible variants for applying the pigment removal calculations that take in account the specified paramters.

Having determined if and to what extent to apply the pigment removal step **(31)**, there follows a white hair treatment step **(32)**, which will be described in further detail with reference to Table III in Appendix III. Table III includes sub-table **(300)** and **(301)**, wherein Table **(300)** is divided into two main sub-tables, according to whether the target hair color is "Cold" **(302)** or "Warm", **(303)**.

Column **(304)** designates the target color level, and row **(305)** designates the target color pigment. Table **(301)**, in its turn, designates the percentage of white hair **(306)**, and the quantity of the additive in grams, **(307)**. As is clearly shown in Table **(300)**, depending on the target color level, an additive (referred to also as base) "0" or "00" is selected. For example, for a color level in the range of 5-9 and target pigment 8, an additive 00 is selected, whereas for the same color level, for color pigment 98, 0 is selected. The quantity of the additive is determined according to the percentage of white hair, as stipulated in Table **(301)**. For example, in the case of 40% white hair, 12 grams of the so-selected additive is used.

In order to understand the meaning of the additives 0 or 00, attention is drawn to the color table in Appendix 1. The 0 and 00 are indicated in columns 100 and 101, and the corresponding columns **(102)** and **(103)**. Additives 0 indicates that one out of a predefined list of natural color additives (base) should be utilized, where each additive is characterized by a natural color level (ranging from 2-10), having each 0 pigment value (see column **(100)**). The upper table is a coined table, but it corresponds to a lower table in Appendix 1, stipulating the existing hair color values of the catalog *Koleston Perfect* of the *Wella*™ Company. Accordingly, column **(100)** in the invented table corresponds to column **(102)** of the *Wella*™ color catalog (*Koleston Perfect*) table, having almost identical values except for that entry 11|0 in the coined table that corresponds to actual *Wella*™ special blond value 12|0 (referred to also as super level blond). It should be noted that in the *Koleston Perfect* catalog, colors range from 2 to 10 scale, 12 indicates a super level blond ingredient and 0 indicates tone enriching pigment.

Column **(101)** and corresponding column **(103)** define the corresponding additive "00",which is similar to the additive "0", except for being a little bit more expressive.

Reverting now to Table III in Appendix III, when a given additive is selected (0 or 00), the actual additive that is used (ranging from 1|0(or 00) to 10|0 (or 00)) depends on the natural hair color of the treated person.

The so selected additive will be used in the subsequent dying procedure.

Next, there follows an inquiry step in order to ascertain whether a post-pigment removal dying treatment should be applied, or a direct hair dying treatment should be applied. In the former case, (i.e., a pigment removal step or steps have been applied), the following procedure is carried out.

At first, the ingredients of the desired hair color are selected, and their quantity is determined in a known *per se* manner. Then, a tone enriching or an additive that should be used is determined according to the provisions of table IV in Appendix 4.

It should be noted that by this embodiment not only tone enriching ingredient is selected but rather additives are used in addition or instead the specified tone enriching ingredients *inter alia* in order to compensate for missing pigments in the inventory of available tone enriching ingredients.

Turning now to Table IV, it is divided into two main sub-tables, "Cold" for cold colors and "Warm" for warm colors (**401** and **402**, respectively), each of which is divided into columns according to the target color pigment. The rows of Table IV define a tone enriching ingredient (**403**), and color levels descending from 9 to 5 (**404-408**) and 4 to 2 (**409**). The ingredient includes a pigment value (**410**) and quantity (**411**), and second tone enriching ingredient (**412**) and quantity (**443**).

Each color level (from 9 to 2) is broken down into pigment (**413-421**), color level (**422-430**) and a quantity (**431-439**). The utilization of the tone enriching ingredient and additive table in steps (**33**), (**35**), or (**36**) (of Fig. 3) will now be exemplified for desired color level say *8*, and for desired color pigment, say *98*. The relevant entry (**440**) indicates that two combinations should be selected, i.e, an additive defined by color level *8* and pigment *08* at quantity *d*, as well as a color additive defined by color level *8* and color pigment *001* in quantity *d*. The determination of the quantity *d* will be discussed below.

Turning now to another example, if, for example, the desired color level is *9*, the desired color pigment is *87* (for warm colors), the relevant entry is (**441**), that defines a tone enriching ingredient having characteristics that are given in the same column (**442**). Thus, the selected tone enriching ingredient having a pigment *78*

(which, as is well known does not contain a color level) at quantity *a*. The manner in which the quantity *a* is determined is discussed below.

Turning now to another example, if, for example, the relevant entry is for color level *8* and the desired color pigment *8*, the appropriate entry is **(443)**, stipulating that a tone enriching ingredient should be used as well as a color level 9, for color pigment 001 at quantity *C*. The particulars of the specified tone enriching ingredient are defined by the relevant tone enriching row for pigment 8, i.e. first tone enriching constituent having pigment *88* at the quantity to be defined by *a* multiplied by 0.75 and a second tone enriching ingredient having pigment level *001* at the quantity to be defined by *a* multiplied by 0.25 (quantities are in grams).

The determination of the quantity values of *c, d* and *a* stipulated above will now be explained with reference to table *V*. Table *V* consists of two sub-tables, the first, stipulates relevant values for existing dyed hair color **(509)**, whereas relevant values for natural hair color are designated **(508)**.

In order to determine the values of *c* and *d* the values of *L* and *E* should at first be calculated. *E* **(445** in Fig. 4) being a coefficient that descends as the color level raises (ranging from 14% to 4%). *L* is determined by the values stipulated in the left and right columns (**501** and **502**) depending on whether the customer has dyed hair **(501)** or natural hair **(502).**

Insofar as the natural hair is concerned, the *L* value varies (1.1 to 1.3) depending upon whether the hair has undergone pigment bleaching **(503);** direct coloring (L=1) or direct coloring for hair that has undergone permanent, anti-permanent or highlighting (L=1.2 or 1.3, depending upon the pigment value). The specific case of pigment that equals *4_* and *6_*, where no *L* value is available, will be discussed below. The values **(510)** and **(511),** designate different *L* values that apply to cold and warm colors, respectively.

The *a* value is defined in columns **(506)** and **(507)** depending upon the *L* value discussed above, and *Y* value indicates the target color level.

Before proceeding any further, it should be noted that in accordance with the invention not only tone enriching ingredients are added, but occasionally also

additive defined by color level and pigment in addition or instead the tone enriching ingredients. This is performed in the case that the existing inventory of tone enriching ingredients is not sufficiently rich and must be "enhanced" by using additves.

Reverting now to step **(33)** in Fig. 3, after having selected the additive and/or the tone enriching ingredient as stipulated by Tables *IV* and *V*, there follows the step of selecting 6% oxygen. The quantity of oxygen used is identical to the quantity of the target color that is used. The components (i.e. additive, tone enriching ingredient, desirable color ingredients and oxygen and white color additive are than mixed and the actual coloring procedure is carried out for a duration as stipulated by the manufacturer's specification, depending on the oxygen percentage to thereby bring about the desired target hair color.

If, on the other hand, no pigment removal step was applied in step **31**, a direct hair dying treatment procedure is applied, **(34)** depending, however, on whether the target hair color is darker than the existing hair color, or not. In the latter case, the hair coloring procedure described in block **33** is repeated, this time, however, using an oxygen percentage that extends over the range of 4-12%, depending on the difference in color level between the existing natural hair color and the desired hair color level (extending over the range of 0-4). More specifically, 0 corresponds to 4%, 1 to 6%, 2 to 7.5%, 3 to 9% and 4 to 12%.

A similar procedure is applied in the case of dark hair color **(36)**. This time, using an oxygen percentage that extends over the range of 4-6% for color level difference that extends over the range of –1 to –2. More specifically, -1 corresponds to 6%, -2 or lower to 4%

Having described the procedure in respect of natural hair color, in Fig. 3, there follows a description in connection with existing dyed hair color, with reference also to Fig. 4. It should be noted, generally, that the dyed treatment in accordance with Fig. 4 applies only to the colored hair part of the hair. Accordingly, if the hair includes roots having a natural hair color they will be subject to the natural hair treatment in accordance with Fig. 3 whereas the remaining part of the

colored hair will be subject to the colored hair treatment as described with reference to Fig. 4.

Reverting now to Fig. 4, at first, a pigment removal step **(41)** is applied, which is identical to the pigment removal step **(31)** described with reference to Fig. 3. Thereafter, an inquiry is made on whether pigment removal has been applied **(42)** and if in the affirmative a post- pigment removal hair dying treatment step **(43)** is applied (which is basically identical to **(33))**, and otherwise a direct hair dying procedure is applied **(44)**. Table 5 stipulates the difference between the natural and dyed hair treatments.

The procedure described with reference to Figs. 3 and 4 are subject to modifications due to the existence of various hair characteristic and the values of the various hair characteristic's parameters.

For example, for scalp sensitivity, if the specified procedure suggests to execute the pigment removal step, and the scalp sensitivity parameter is set (indicating that the customer has a sensitive scalp) a warning message indicates that such pigment removal procedure should be ignored as it may injure the scalp. This recommendation may be overruled or complied with. In the latter case the customer will be requested to select a new color which obviates the need to carry out a pigment removal step. The same applies to situations where the oxygen exceeds 9%.

By way of another example, if the specified procedure suggests to execute the pigment removal step, and the permanent or anti-permanent parameter is set, a warning message indicates that such pigment removal procedure should be ignored as it may destroy the permanent or anti-permanent . This recommendation may be overruled or complied with. In the latter case the customer will be requested to select a new color which obviates the need to carry out a pigment removal step.

In the case of a permanent or anti-permanent or highlights or damaged or split the *L* value varies as described in detail with reference to tables *IV* and *V*.

In the specific case where the color pigment is 4_ or 6_ (i.e. pigment equals 4_ or 6_ in table *V*), there are neither adequate tone enriching ingredient nor

adequate additive, and therefore alternative modification is applied to the procedures stipulated in Figs. 3 and 4. It should be noted that in the tables reference to $x\_$ designates that the '_' may optionally stand for a digit. Thus 4_ may represent the numbers 4, 41, 42, ...49.

More specifically a reduction by 20% of the oxygen quantity is recommended. Thus, whereas in the normal procedure, the quantity of the oxygen equals the quantity of the color, in accordance with the embodiment where a permanent, anti-permanent, highlighted, damaged hair or split hair exists, and the desired color pigment is 4 or 6, the oxygen quantity is set to 80 % of the color quantity.

Special treatment is also applied in cases where the colored hair exceeds by a preferred embodiment 80%, in which case an indication is made that the white hair additive (selected in accordance with table 3) is applied to the roots (in the case of dyed hair) or to the natural hair, for a predetermined period, preferably, ten minutes before coloring.

In the above preferred embodiment, the following hair characteristic's parameters were utilized in order to affect the hair coloring procedure, i.e., permanent, anti-permanent, highlights, damaged hair or split ends, white hair over 80% and scalp sensitivity

As explained above, in a preferred embodiment, the specified hair characteristic data, as well as the present hair data are *a priori* stored in a database, and therefore the need to re-determine them before each treatment is obviated since they can be easily extracted from the database. By following this approach not only that the customer time is saved since the hair coloring treatment can start immediately following the retrieval of the specified data (and the indication of the desired hair color) but also the error prone procedure of calculating or determining the specified hair characteristic parameters is obviated.

In order to assist in determining the specified parameters for the first time or determining in an accurate manner the existing hair color, known per se hair color

analyzing techniques may be utilized, such as (for determining current hair color) those disclosed in WO 96/41139.

The above referred to procedure may be utilized in various applications such as retrieving the data that pertains to a customer data from a central database through communication network, say, the Internet, enabling thus the customer to visit a hairdresser (who is not necessarily his/her regular hairdresser). The hairdresser is equipped with a node coupled to said communication network and performing the specified calculations either locally at the node or fully oor partially with the assistance of remote processor node. Such procedure involves, of course, known *per se* admittance control procedure in order to secure safe retrieval of data only by authorized parties.

The specified application enables to any professional to extract the relevant data from the database and apply the hair coloring procedure to a customer who visits geographical sites other than his/her home neighborhood and thus to benefit from qualitative hair coloring during overseas holidays business trips etc.

If desired, the data of the customer may be held in a personal storage medium, say, a smart card, plugged in and used whenever the customer visits his/her regular hairdresser or other professional. Other variants of applications are applicable, all as required, appropriately depending upon the particular application.

Other applications are also applicable such as linking to integrated billing system for charging the client, provision of computerized catalog of colors which enables the customer to select his/her requested color and obtain a simulation how it looks before he/she commits on the actual color, etc.

In the method claims that follow, alphabetic characters used to designate claim steps are provided for convenience only and do not imply any particular order of performing the steps.

The present invention has been described with a certain degree of particularity, but various alterations and modifications may be carried out without departing from the scope of the present application.

CLAIMS:

1. An aiding system for hair color comprising:

   (a) input means for receiving *desired customer color hair data;* and *customer color hair data* that include *present hair color* and *hair characteristics data;*

   (b) storage means for storing data that includes *static aiding data* and *pertinent hair treatment procedures*

   (c) processor responsive to at least said *customer color hair data, desired customer color hair data and static aiding data* for executing hair color treatment procedure.

2. The system according to Claim 1, wherein said *hair characteristics data* include at least one of the following *Sensitive Scalp, Permanent Anti-permanent , Highlighted hair, Damaged hair, Split Hair ends; whether or not there is substantial percentage of white hair*;

3. The system according to Claims 1 or 2, wherein the static aiding data includes pigment table, white hair table, tone enriching and additive table, pigment removal with blond level and color table

4. The system according to anyone of the preceding Claims, wherein said *customer color hair data* is *a-priori* stored in said storage means and said processor is configured to retrieve said *customer color hair data.*

5. The system according to anyone of the preceding Claims, wherein said *hair characteristic data* is *a-priori* stored in said storage means and said processor is configured to retrieve said *hair characteristic data.*

6. The system according to anyone of the preceding Claims wherein said hair color treatment procedure is selected from the group of :

   i) natural hair color procedure; and

   ii) dyed hair color procedure.

7. The system according to Claim 6, wherein said natural hair color procedure includes:

(a) applying a pigment bleaching calculation;

(b) applying a white hair treatment calculation in order to determine if, and to what extent, a color base should be added, depending upon the percentage of existing white hair;

(c) in the case that the calculation in (a) resulted in pigment bleaching, applying post-pigment removal calculation stage;

(d) in the case that the calculation in (a) resulted in no pigment bleaching ascertaining whether the desired hair color is darker than the present hair color and if in the affirmative applying first direct hair dying treatments calculation and, otherwise applying second direct hair dying treatments calculation.

8. The system according to Claim 6, wherein said dyed hair color procedure includes:

(a) applying a pigment bleaching calculation;

(b) in the case that the calculation in (a) resulted in pigment bleaching, applying post-pigment removal calculation stage;

(c) in the case that the calculation in (a) resulted in no pigment bleaching direct hair dying treatments calculation is applied.

9. The system according to Claims 7 or 8, wherein said pigment bleaching calculation takes into account at least the following parameters:

(a) different in hair color levels between present hair color and desired hair color; and

(b) different in hair color pigment between present hair color and desired hair color.

10. The system according to Claim 9, wherein in the case that difference in hair color levels stipulates a first pigment removal step and the difference in hair color pigment stipulates a second pigment removal step, selecting the more radical pigment removal step.

11. The system according to Claim 7, wherein in the cases that the hair characteristic data specify that the present hair color includes substantial amount of white hair, an indication is made that a white hair additive should applied to the

roots in the case of dyed hair or to the natural hair for a predetermined period before coloring.

12. The system according to Claims 7 or 8, wherein in the post-pigment removal calculation stage and the direct hair dying treatments calculation an additive or additive and tone enriching ingredients are selected.

13. The system according to Claims 7, 9 or 10, wherein in the case of difference in hair level of 4 a more moderate pigment removal procedure is calculated utilizing a super-level blond ingredient.

14. The system according to anyone of Claims 7 to 13, wherein the indication is generated in the case that the sensitive scalp parameter is set or the damaged hair parameter is set as well as the pigment removal calculation indicates that an oxygen percentage of 9% or more is to be used.

15. The system according to anyone of Claims 7 to 13, wherein indication is generated in the case that the pigment removal calculation give rise to affirmative result and the permanent or anti-permanent parameter are set.

16. The system according to anyone of the preceding Claims, comprising a central database constituting said storage means which is coupled through communication network to plurality hairdresser nodes each configured to perform the specified processing steps.

17. The system according to Claim 16, further comprising admittance control procedure in order to secure safe retrieval of data only by authorized parties.

18. The system according to anyone of the preceding Claims, wherein the data of the customer being held in a personal storage medium communicating with the processor.

19. An aiding system for hair color comprising:

(a) input means for receiving *desired customer color hair data;* and *customer color hair data* that include *present hair color* and *hair characteristics data;*

(b) storage means for storing data that includes *static aiding data* and *pertinent hair treatment procedures*

(c) processor responsive to at least said *customer color hair data, desired customer color hair data and static aiding data* for executing hair color treatment procedure; the hair color procedure includes a pigment bleaching calculation that takes into account at least the following parameters:

i) different in hair color levels between present hair color and desired hair color; and

ii) different in hair color pigment between present hair color and desired hair color.

20. An aiding system for hair color comprising:

(a) input means for receiving *desired customer color hair data;* and *customer color hair data* that include *present hair color* and *hair characteristics data;*

(b) storage means for storing data that includes *static aiding data* and *pertinent hair treatment procedures*

(c) processor responsive to at least said *customer color hair data, desired customer color hair data and static aiding data* for executing hair color treatment procedure; wherein in the cases that the hair characteristic data specify that the present hair color includes substantial amount of white hair, the hair color treatment procedure includes an indication that a white hair additive should be applied to the roots in the case of dyed hair or to a natural hair for a predetermined period before coloring.

21. An aiding system for hair color comprising:

(a) input means for receiving *desired customer color hair data;* and *customer color hair data* that include *present hair color* and *hair characteristics data;*

(b) storage means for storing data that includes *static aiding data* and *pertinent hair treatment procedures;*

(c) processor responsive to at least said *customer color hair data, desired customer color hair data and static aiding data* for executing hair color

treatment procedure; the hair color treatment procedure includes providing an indication in the case that a sensitive scalp parameter is set or a damaged hair parameter is set as well as the pigment removal calculation indicates that an oxygen percentage of 9% or more is to be used in the color treatment procedure.

22. An aiding system for hair color comprising:

(a) input means for receiving *desired customer color hair data;* and *customer color hair data* that include *present hair color* and *hair characteristics data;*

(b) storage means for storing data that includes *static aiding data* and *pertinent hair treatment procedures;*

processor responsive to at least said *customer color hair data, desired customer color hair data and static aiding data* for executing hair color treatment procedure; the hair color treatment procedure includes an indication in the case that a pigment removal calculation give rise to affirmative result and the permanent or anti-permanent parameter are set.

23. The method according to Claim 22, wherein said *hair characteristics data* include at least one of the following *Sensitive Scalp, Permanent Anti-permanent , Highlighted hair, Damaged hair, Split Hair ends; whether or not there is substantial percentage of white hair*;

24. The method according to Claims 22 or 23, wherein the static aiding data includes pigment table, white hair table, tone enriching and additive table, pigment removal with blond level and color table.

25. The method according to anyone of Claims 22 to 24, wherein said hair color treatment procedure is selected from the group of :

i) natural hair color procedure; and

ii) dyed hair color procedure.

26. The method according to Claim 25, wherein said natural hair color procedure includes:

(a) applying a pigment bleaching calculation;

(b) applying a white hair treatment calculation in order to determine if, and to what extent, a color base should be added, depending upon the percentage of existing white hair;

(c) in the case that the calculation in (a) resulted in pigment bleaching, applying post-pigment removal calculation stage;

(d) in the case that the calculation in (a) resulted in no pigment bleaching ascertaining whether the desired hair color is darker than the present hair color and if in the affirmative applying first direct hair dying treatments calculation and, otherwise applying second direct hair dying treatments calculation.

27. The method according to Claim 25, wherein said dyed hair color procedure includes:

(a) applying a pigment bleaching calculation;

(b) in the case that the calculation in (a) resulted in pigment bleaching, applying post-pigment removal calculation stage;

(c) in the case that the calculation in (a) resulted in no pigment bleaching direct hair dying treatments calculation is applied.

28. The method according to Claims 26 or 27, wherein said pigment bleaching calculation takes into account at least the following parameters:

(a) different in hair color levels between present hair color and desired hair color; and

(b) different in hair color pigment between present hair color and desired hair color.

29. The method according to Claim 28, wherein in the case that difference in hair color levels stipulates a first pigment removal step and the difference in hair color pigment stipulates a second pigment removal step, selecting the more radical pigment removal step.

30. The method according to Claim 26, wherein in the cases that the hair characteristic data specify that the present hair color includes substantial amount of white hair, an indication is made that a white hair additive should applied to the

roots in the case of dyed hair or to the natural hair for a predetermined period before coloring.

31. The method according to Claims 26 or 27, wherein in the post-pigment removal calculation stage and the direct hair dying treatments calculation an additive or additive and tone enriching ingredients are selected.

32. The method according to anyone of Claims 26 to 31, further comprising the step of generating an indication in the case that the sensitive scalp parameter is set or the damaged hair parameter is set as well as the pigment removal calculation indicates that an oxygen percentage of 9% or more is to be used.

33. The method according to anyone of Claims 26 to 31, further comprising the step of generating an indication in the case that the pigment removal calculation give rise to affirmative result and the permanent or anti-permanent parameter are set.

34. A method for aiding in hair color comprising:

(a) receiving *desired customer color hair data;* and *customer color hair data* that include *present hair color* and *hair characteristics data;*

(b) storing data that includes *static aiding data* and *pertinent hair treatment procedures*

(c) executing hair color treatment procedure utilizing at least said *customer color hair data, desired customer color hair data and static aiding data.*

the hair color procedure includes a pigment bleaching calculation step that takes into account at least the following parameters:

i) different in hair color levels between present hair color and desired hair color; and

ii) different in hair color pigment between present hair color and desired hair color.

35. A method for aiding in hair color comprising:

(a) receiving *desired customer color hair data;* and *customer color hair data* that include *present hair color* and *hair characteristics data;*

(b) storing data that includes *static aiding data* and *pertinent hair treatment procedures*

(c) executing hair color treatment procedure utilizing at least said *customer color hair data, desired customer color hair data and static aiding data.*

the hair color treatment procedure includes the step of: in the cases that the hair characteristic data specify that the present hair color includes substantial amount of white hair, the hair color treatment procedure generating an indication that a white hair additive should be applied to the roots in the case of dyed hair or to a natural hair for a predetermined period before coloring.

36. A method for aiding in hair color comprising:

(a) receiving *desired customer color hair data;* and *customer color hair data* that include *present hair color* and *hair characteristics data;*

(b) storing data that includes *static aiding data* and *pertinent hair treatment procedures*

(c) executing hair color treatment procedure utilizing at least said *customer color hair data, desired customer color hair data and static aiding data.*

the hair color treatment procedure includes the step of providing an indication in the case that a sensitive scalp parameter is set or a damaged hair parameter is set as well as the pigment removal calculation indicates that an oxygen percentage of 9% or more is to be used in the color treatment procedure.

37. A method for aiding in hair color comprising:

(a) receiving *desired customer color hair data;* and *customer color hair data* that include *present hair color* and *hair characteristics data;*

(b) storing data that includes *static aiding data* and *pertinent hair treatment procedures*

(c) executing hair color treatment procedure utilizing at least said *customer color hair data, desired customer color hair data and static aiding data.*

the hair color treatment procedure includes the step of generating an indication in the case that a pigment removal calculation give rise to affirmative result and the permanent or anti-permanent parameter are set.

38. A method for aiding in hair color comprising:

(a) receiving *desired customer color hair data;* and *customer color hair data* that include *present hair color* and *hair characteristics data;*

(b) storing data that includes *static aiding data* and *pertinent hair treatment procedures*

(c) executing hair color treatment procedure utilizing at least said *customer color hair data, desired customer color hair data and static aiding data.*

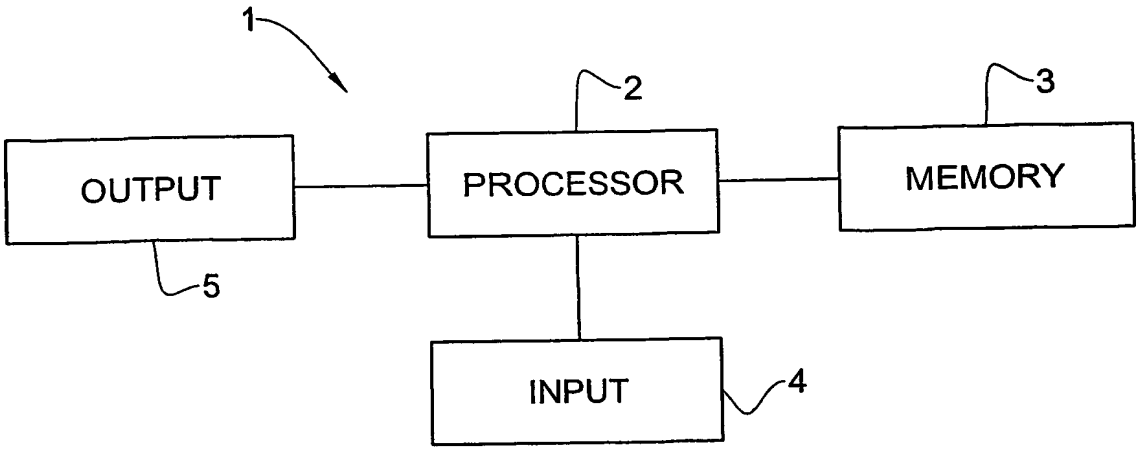
1
2
3
OUTPUT
PROCESSOR
MEMORY
5
INPUT
4

FIG. 1

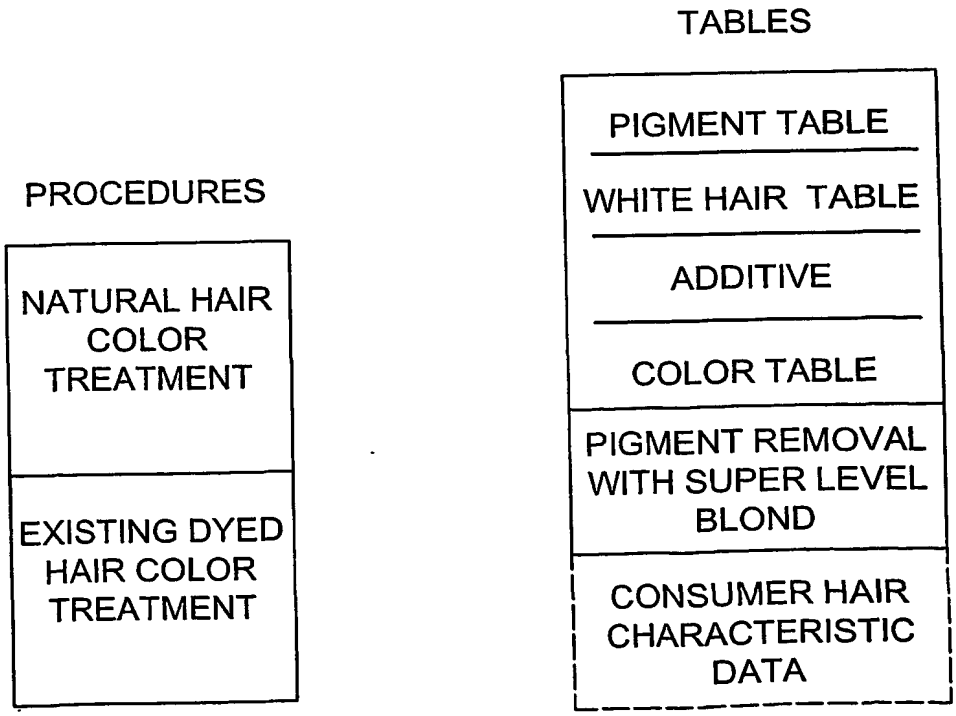
TABLES
PIGMENT TABLE
WHITE HAIR TABLE
ADDITIVE
COLOR TABLE
PIGMENT REMOVAL WITH SUPER LEVEL BLOND
CONSUMER HAIR CHARACTERISTIC DATA
PROCEDURES
NATURAL HAIR COLOR TREATMENT
EXISTING DYED HAIR COLOR TREATMENT

FIG. 2

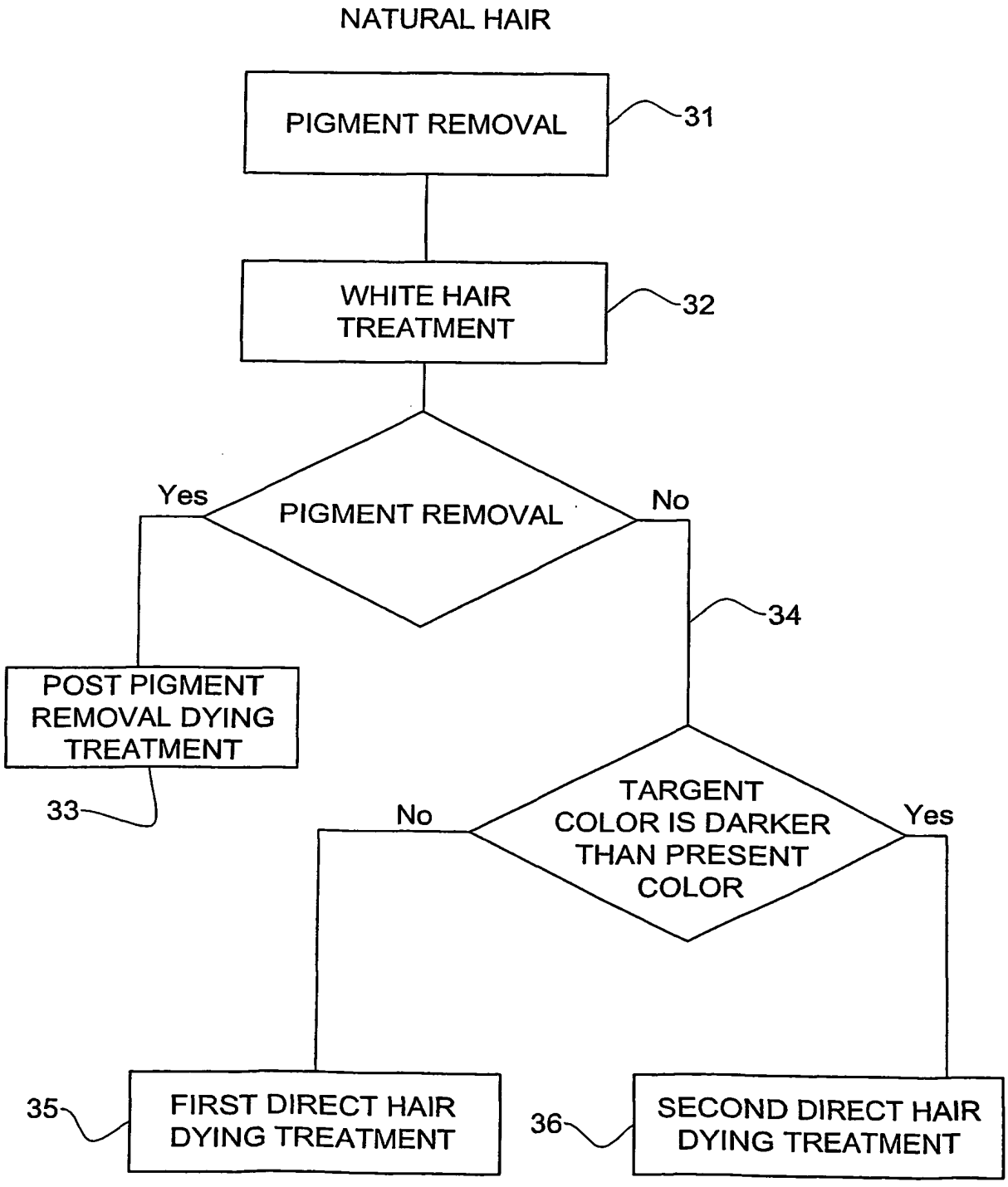

FIG. 3

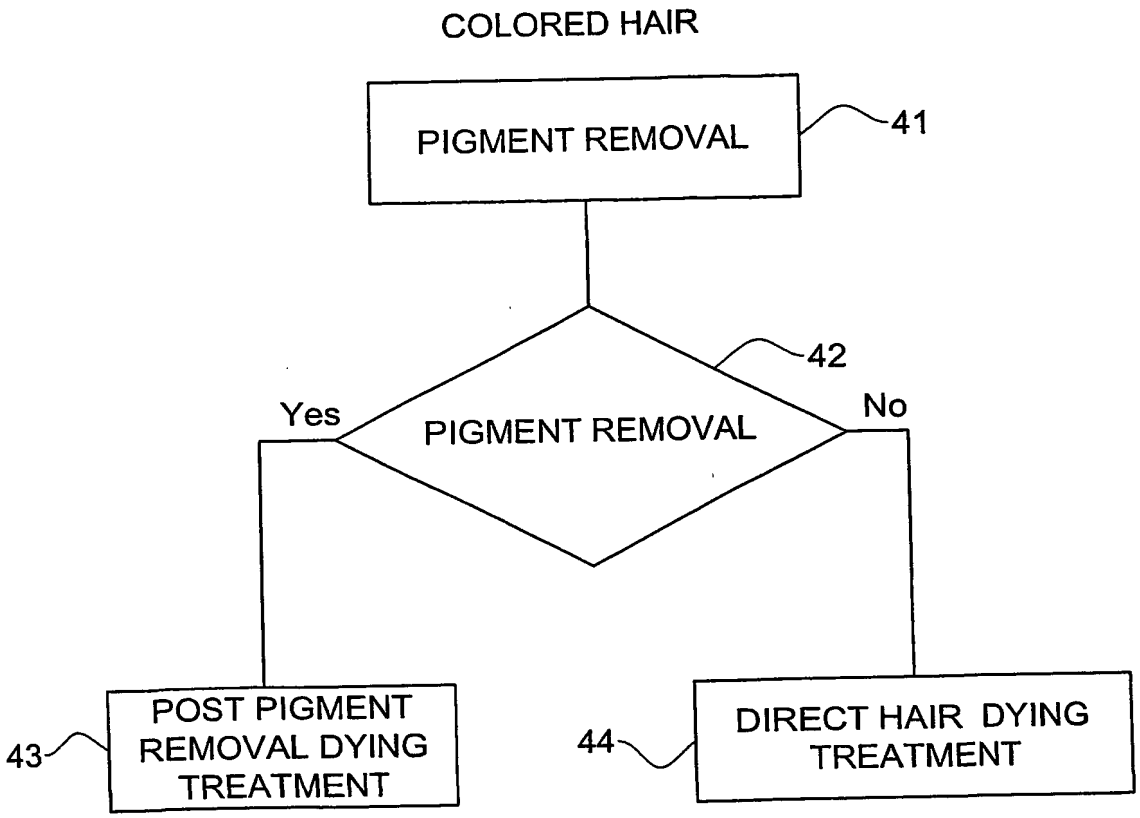
COLORED HAIR
PIGMENT REMOVAL
41
42
PIGMENT REMOVAL
Yes
No
POST PIGMENT REMOVAL DYING TREATMENT
43
DIRECT HAIR DYING TREATMENT
44

FIG. 4

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(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

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Published:
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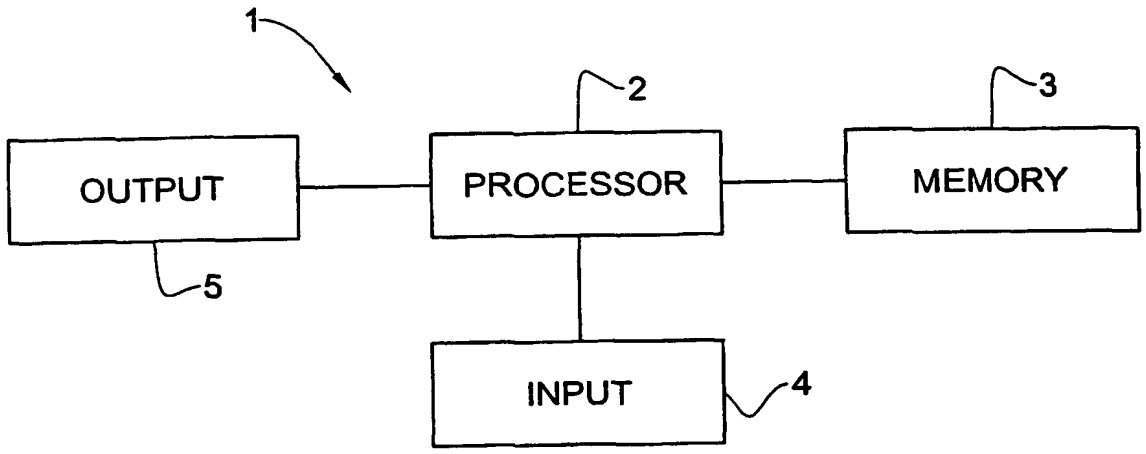
12 September 2002

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: A METHOD FOR HAIR COLOR TREATMENT



(57) Abstract: An aiding system (1) for hair color that includes input data (4) indicative of desired customer color hair data and existing customer color hair data. The latter data indicates also the present hair color and hair characteristics data. The system (1) further stores data that includes static aiding data and pertinent hair treatment procedures. Still further, the system (1) includes a processor (2) that is capable of processing the customer color hair data, desired customer color hair data and static aiding data for executing hair color treatment procedure.

WO 01/091602 A3

INTERNATIONAL SEARCH REPORT

International Application No
PC[redacted]IL 01/00511

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A45D44/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 A45D G01J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 96 41139 A (CHROMATICS COLOR SCIENCES INT ;BILLMEYER FRED W (US); MACFARLANE D) 19 December 1996 (1996-12-19) cited in the application page 3, line 1-15 page 3, line 26 -page 4, line 8 page 12, line 31 -page 13, line 17 ---	1-34,38
A	EP 0 290 327 A (3 C I SOC ;SCHWARZKOPF FRANCE (FR)) 9 November 1988 (1988-11-09) abstract; figures 1-3 ---	1-34,38
A	WO 99 09941 A (BIELER HEINZ JURGEN ;SCHWARZKOPF INC (US)) 4 March 1999 (1999-03-04) abstract; figures 1-6 ---	1-34,38
	-/--	

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
15 February 2002	09. 07 2002
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Authorized officer Garcia, J

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

International Application No
PC[redacted]L 01/00511

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 643 341 A (HIRSCH LELAND ET AL) 1 July 1997 (1997-07-01) abstract; figure 2	1-34,38

Form PCT/ISA/210 (continuation of second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IL 01/00511

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-34,38

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest.

☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-34,38

   System and method for aiding in hair colouring. The method comprises a procedure including a pigment bleaching calculation step which takes into account the difference in hair colour levels and hair colour pigment between present hair colour and desired hair colour.

2. Claim : 35

   Method for aiding in hair colouring comprising the execution of a procedure which includes an step indicating that white hair additive should be applied in case of a substantial presence of white hair.

3. Claim : 36

   Method for aiding in hair colouring comprising the execution of a procedure which includes an step taking into account the presence of sensitive scalp.

4. Claim : 37

   Method for aiding in hair colour comprising the execution of a procedure which includes an step for the special handling of permanented or anti-permanented hair.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PC[redacted]L 01/00511

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
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